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ABSTRACT OF THE DISCLOSURE

An apparatus comprising a first circuit, a second circuit and a third circuit. The first circuit may be configured to generate an upconverted signal in response to an input signal and a first oscillation signal. The second circuit may be configured to generate a downconverted signal in response to the upconverted signal and as second oscillation signal. The third circuit may be configured to generate an output signal in response to the downconverted signal and a third oscillation signal derived from the second oscillation signal. The upconverting and downconverting may filter undesired channels from the output signal.